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**Abstract**

The use of composite materials as a reinforcement for concrete in civil construction has become a significant topic, the quality of the joint between composite and concrete being one of the key parameters to study. The preparation of surfaces involved in the joint and the fabrication procedure are relevant factors in this quality. Two surface treatments of concrete (grinder and grit sandpaper) and three manufacturing techniques of the composite and corresponding joining to the concrete (pre-cured composite, wet hand lay-up and infusion) have been employed. To evaluate the quality of the joint, four tests have been applied: Lap peeling, Lap shear, Pull off and Shear torsion. Once the tests were carried out, all of them were found representative of the quality of the joint and it was observed that concrete cracking predominates over adhesive or cohesive failures, which indicates a satisfactory adhesion between the concrete and the composite. Grinder surface treatment was found the best option, and with reference to the manufacturing technique, the use of pre-fabricated reinforcement was found to lead to undervalues of the properties.

**Keywords:** composite material; concrete; joining; testing; surface treatment**1. Introduction**

There is currently a large effort in investigating new strengthening systems for concrete structures based on composite materials, developing current knowledge and generating new related technologies that are sustainable and respectful of the environment. Rehabilitation through structural strengthening is where composite materials has found a large field of application both for masonry and concrete structures. First, the rehabilitation or strengthening of structures is executed to increase their useful life. Rehabilitation can be carried out in structures that are damaged, poorly executed or that simply require a greater carrying capacity as a result of increased demands. Second, composite materials do not present degradation by

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